REMARKS

This is in response to the Office Action of June 17, 2010. Claims 1, 3, and 4 are pending in the application. Favorable reconsideration of the patentability of claims 1, 3, and 4 is earnestly solicited.

The invention

Applicants' invention is defined in independent claim 1 as follows:

> 1. A polyester resin composition which is obtained by melt mixing (A) a copolyester, in an amount of 1 to 50 parts by weight, with (B) a crystalline polyester that is not identical with component (A), in an amount of 99 to 50 parts by weight,
>
> wherein the copolyester (A) comprises a hydroxy carboxylic acid unit as constituent units, in which hydroxy carboxylic acid units of 5 or less carbon atoms are contained in amounts of 60 to 98% by mol based on 100% by mol of all the constituent units in (A),
>
> wherein hydroxy carboxylic acid units of 5 or less carbon atoms are contained in amounts of 2 to 75% by mol based on 100% by mol of all the constituent units contained in the composition,
>
> wherein the copolyester (A) has a glass transition temperature of 25 to 90°C, and
>
> wherein a molar ratio S_{AA} of hydroxy carboxylic acid units, both of whose neighboring units are hydroxy carboxylic acid units, to all the hydroxy carboxylic acid units contained and a molar ratio S_{BB} of hydroxy carboxylic acid units, neither of whose neighboring units is a hydroxy carboxylic acid unit, to all the hydroxy carboxylic acid units contained satisfy the following formula:
>
> $0.03 < S_{AA}/S_{BB} < 30$.

Prior art rejection

Claims 1, 3, and 4 were rejected under 35 U.S.C. § 103(a) as being unpatentable over US 4,565,851 (Barbee) in view of JP 2002-264206 (Sakurai). Office Action, pages 2-5. The

rejection is respectfully traversed.

The Examiner admits that the prior art applied in the rejection fails to provide an explicit disclosure of the feature "the copolyester (A) has a glass transition temperature of 25 to 90°C." The Examiner contends, however, that "though there is no explicit disclosure of the glass transition temperature of glycolic acid copolymer in Sakurai there are two implicit disclosures."

First alleged implicit disclosure

In support of the rejection, the Examiner contends in the paragraph bridging pages 3-4 of the Office Action that "Sakurai discloses that the glycolic acid copolymer is crystalline [0011] which is an implicit disclosure of a glass transition temperature range of 25°C (room temperature) or greater." Applicants disagree.

For instance, as shown on page VI/207 of the "Polymer Handbook", isotactic polypropylene and syndiotactic polypropylene – which are crystalline polymers – have glass transition temperatures of below 265°K and 272°K, respectively. These temperatures are below the freezing point of water (which is 273.15°K) and are not at all room temperature or greater as asserted by the Examiner. On the other hand, according to page VI/211 of the "Polymer Handbook," atactic polystyrene – which is an amorphous polymer – has a glass transition temperature of 373°K, which is far higher than room temperature (in fact, about the boiling point of water). Applicants respectfully submit, therefore, that the Examiner's assertion of the implicit disclosure of "a glass transition temperature range of 25°C (room temperature) or greater" derived from the disclosure of a "crystalline glycolic acid copolymer" has no scientific basis.

Second alleged implicit disclosure

In further support of the rejection, the Examiner contends in the paragraph bridging pages 3-4 of the Office Action that "Sakurai discloses that the extension temperature is between the glass transition temperature and 60°C above the glass transition temperature, preferably between the glass transition temperature and 40°C above the glass transition temperature [0041]. Since the exemplified extension temperature is 65°C [0061] this is an implicit disclosure of a range of glass transition temperature between 5°C and 65C, preferably 25°C and 65°C." Applicants disagree with this contention as well.

The extension temperature of 65°C to which the Examiner refers is disclosed in Sakurai paragraph [0061] in the context of a specific working example. Even if a glass transition temperature is calculated from this value in the manner indicated in paragraph [0041] of Sakurai, the calculation will simply provide a suggestion of the glass transition temperature of the glycolic acid copolymer specifically described in the example. Properties such as "crystallinity" and "glass transition temperature" vary depending on the polymer composition, structure, spatial arrangement, and other factors.

General considerations

The glycolic acid copolymer in Examples 1 to 6 of Sakurai is a copolymer of glycolide and lactide, which is a copolymer composed of 100 mol-% of hydroxyl carboxylic acid units of 5 or fewer carbon atoms. The glycolic acid copolymer of Example 7 is a copolymer of glycolide, lactide, and ε-caprolactone. In contrast, copolyester (A) of the present invention contains 60 to 98 mol-% of hydroxyl carboxylic acid units based on 100 mol-% of all the constituent units contained, and the residue is composed of a dicarboxylic acid and a diol[1]. The feature in Applicants' invention – that the residue is composed of a dicarboxylic acid and a diol – is disclosed in detail starting on page 9 of the specification.

(1.) It is important to note that in the first place, the copolymer of Sakurai is significantly different from that of the present invention. The glycolic acid copolymer of Sakurai, which is composed of 100 mol-% of hydroxy carboxylic acid units of 5 or less carbon atoms, is – as indicated in paragraph [0014] of Sakurai – although it is not amorphous, a glycolic acid copolymer with special crystalline property characterized by a low speed of crystallization.

(2.) In addition, there is no example of a glycolic acid copolymer containing the monomers exemplified in paragraph [0027] of Sakurai, that is, ethylene glycol and an aromatic dicarboxylic acid, with a clear indication of the "glass transition temperature."

(3.) Moreover, Sakurai fails to provide any teaching or suggestion of the inventive

[1] This is expressed in Applicants' claim 1 as "wherein the copolyester (A) comprises a hydroxy carboxylic acid unit as constituent units, in which hydroxy carboxylic acid units of 5 or less carbon atoms are contained in amounts of 60 to 98% by mol based on 100% by mol of all the constituent units in (A), wherein hydroxy carboxylic acid units of 5 or less carbon atoms are contained in amounts of 2 to 75% by mol based on 100% by mol of all the constituent units contained in the composition."

concept of melt-mixing a glycolic acid copolymer and a crystalline polyester to obtain a polyester resin composition having a specific S_{AA}/S_{BB} ratio. Applicants' claims require that "a molar ratio S_{AA} of hydroxy carboxylic acid units, both of whose neighboring units are hydroxy carboxylic acid units, to all the hydroxy carboxylic acid units contained and a molar ratio S_{BB} of hydroxy carboxylic acid units, neither of whose neighboring units is a hydroxy carboxylic acid unit, to all the hydroxy carboxylic acid units contained [satisfies] the following formula: $0.03 < S_{AA}/S_{BB} < 30$." Melt-mixing a polyester involves an ester exchange reaction. With more and more melt-mixing, the ester exchange reaction will progress far and eventually the block proportion will be lost and the resultant polyester will be homogenous. This would undermine the significance of mixing the two components.

SUMMARY. The present invention, in view of this, focuses on controlling the block proportion of the two kinds of polyesters – "(A) a copolyester, in an amount of 1 to 50 parts by weight, with (B) a crystalline polyester that is not identical with component (A), in an amount of 99 to 50 parts by weight … wherein a molar ratio S_{AA} of hydroxy carboxylic acid units, both of whose neighboring units are hydroxy carboxylic acid units, to all the hydroxy carboxylic acid units contained and a molar ratio S_{BB} of hydroxy carboxylic acid units, neither of whose neighboring units is a hydroxy carboxylic acid unit, to all the hydroxy carboxylic acid units contained satisfy the following formula: $0.03 < S_{AA}/S_{BB} < 30$." This provides a resin composition that has good gas barrier properties and that has an excellent balance between mechanical properties, heat resistance, transparency, and coloration. The S_{AA}/S_{BB} ratio is an indication of the block proportion. Thus, the assumption by the Examiner that mixing would automatically satisfy the claimed S_{AA}/S_{BB} ratio cannot be accepted.

CONCLUSION. There is no convincing rationale for combining Barbee with Sakurai. However, even if Barbee is combined with Sakurai, the presently claimed invention is not obvious from the combination because copolyester (A) of the present invention differs significantly from the glycolic acid copolymer of Sakurai.

The presently claimed invention considered as a whole is manifestly not obvious from the disclosure of the references applied. Withdrawal of the rejection based upon Barbee in view of Sakurai is in order and is earnestly solicited.

Contact information

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Richard Gallagher, Reg. No. 28,781, at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By .....

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